An increasing number of studies have linked the appearance of reproductive disorders in wildlife species to exposure to environmental contaminants that are capable of eliciting responses typically induced by sex steroids. These compounds have been termed endocrine-disrupting chemicals (EDCs). We report that of correlation ($r^2=0.93$) was revealed.

Measurement of spiggin with the ELISA method is as accurate as, has a higher resolution than, and is considerably quicker than the histological method employed previously, involving measurements

**Description of the unique bioassay for (anti)-androgens**

During breeding and in response to androgens, the kidney of the male stickleback increases considerably in size and produces a novel structural, glue protein, which is used as a cementing substance for the building of a nest (Borg et al., 1995). The protein has been characterised as a 200kDa glucoprotein and termed spiggin (Jakobsson et al., 1999) from the Swedish name of the stickleback, the spigg. The development of an ELISA for spiggin, the only known so far, androgen- and anti-androgen-specific compounds in the aquatic environment. We are presently developing a visiogelogen ELISA so that we can simultaneously assess oestrogens and anti-oestrogens.

**Figure 2: ELISA Validation**

The stickleback's clear-cut androgen/anti-androgen end-point gives it undoubtedly an advantage over other proposed EDC test-species. No problems are foreseen in developing an EDC test-species. No problems are foreseen in developing an

**Figure 4: Effect of flutamide and EE2 on spiggin production**

**Figure 6: Kidney epithelium height and spiggin induction by PME in female sticklebacks**

**Conclusion**


**Acknowledgements**

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**References**


Female sticklebacks, exposed to pulp mill effluent (PME) demonstrated significant kidney stimulation, confirming the androgenicity of this effluent. This finding was established by the application of both the ELISA and the histological assay. Again, regression analysis showed an excellent coefficient of correlation ($r^2<0.94$). We report that of correlation ($r^2=0.93$) was revealed.

**Figure 2: ELISA Validation**

**Figure 4: Effect of flutamide and EE2 on spiggin production**

**Figure 6: Kidney epithelium height and spiggin induction by PME in female sticklebacks**

**Conclusion**


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**References**


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